Gestational diabetes mellitus (GDM) is a common complication in pregnancy. Diabetes is growing at an alarming rate in North America and worldwide. In this article we will be looking at: current trends in diabetes, risk factors for both the mother and the baby, dietary advice often given during pregnancy, and prevention strategies needed to slow the rate of growth of this epidemic disease.

What is Gestational Diabetes Mellitus?
This form of diabetes occurs only during pregnancy; once the baby is delivered, the condition is reversed. In our bodies, insulin works by taking sugar from the blood and moving it into cells where it can be used for energy. Hormones made by the placenta that resist insulin, along with the growing demands of the fetus in the second and third trimester, increase pregnant women’s insulin needs by two to three times that of normal. Insulin resistance is defined as the body’s inability to respond to and use the insulin it produces. If a pregnant woman’s body cannot increase secretion of insulin, sugar from foods will stay in the blood stream and cause high blood sugar (Buchanan and Xiang 2005; Dunbar 2001). A woman who does not have good control over her GDM can have a large baby. Since the woman’s body has extra blood glucose (or sugar) in her bloodstream, the extra sugar is transferred to her baby through the placenta. This causes the baby’s pancreas to produce additional insulin to process the blood glucose. Since the baby is receiving more energy than required for growth and development, the extra is stored as fat and the baby becomes larger and larger (Rubin 1999). Although GDM disappears after birth, Type 2 diabetes develops within fifteen years after pregnancy in approximately half of the women who had gestational diabetes (Rubin 1999). The majority of women with GDM have chronic insulin resistance, along with other risk factors that increase their chances of developing Type 2 diabetes (Buchanan and Xiang 2005). In some instances, pregnancy uncovers undiagnosed Type 2 diabetes and, more rarely, Type 1 diabetes.

Some women are worried that if they eat too many sweet foods they will develop GDM. Fortunately, GDM does not work this way; however, a woman who eats sweets during her pregnancy and, in turn, gains an excessive amount of weight increases her risk of developing GDM. Rates of GDM range from 3% to 8% in all pregnancies. The frequency does vary among ethnic groups, with a higher prevalence among Aboriginal, Asian, African-American, and Hispanic populations (Buchanan and Xiang 2005; Dabelea, et al. 2005). In fact, many of us working with pregnant women may be seeing more women diagnosed with this condition. This may be the result of two factors:

1. Increased screening leads to the diagnosis of cases that would have remained undiscovered in prior years.
2. The prevalence of GDM has truly increased.

Current trends:
A recent study in Colorado found a 12% per year increase in the prevalence of GDM between 1994 and 2002 (Dabelea, et al. 2005). We know that the worldwide incidence of Type 2 diabetes is skyrocketing, and it appears that GDM is following the same trend. Over the past twenty years in the United States there has been a 33% increase in the incidence of Type 2 diabetes, which is associated with a parallel increase in obesity (Catalano, et al. 2003). It is estimated that given the current trends in obesity, over a third of all people born in 2002 will eventually develop diabetes (from www.about.com — Type 2 diabetes). At one time, Type 2 diabetes was only seen in older adults, but in recent years, adolescents have become the fastest-growing group. Women are often worried that having GDM means their baby also has diabetes. Simply put, the baby does not have diabetes; however, being exposed to diabetes during pregnancy may be an important contributor to the increasing prevalence of obesity and Type 2 diabetes in youth: this has recently been shown in the children of a Pima Indian population (Dabelea, et al. 2005).

Why is GDM on the rise?
One theory as to why GDM exists is that our modern nutrition has collided with our evolutionary inheritance. Normal pregnancy is a period of insulin resistance, and our bodies have traditionally been able to compensate by producing more insulin; but, unlike any other time in human history, our bodies are now being taxed by a high-carbohydrate diet. In fact, human evolution was characterized by very low-carbohydrate nutrition. Our current diet of very high-carbohydrate foods, along with the state of insulin resistance during pregnancy, causes some women to produce insufficient amounts of insulin to meet all of these demands (Kopp 2005).

Who is at risk?
According to the Chicago Dietician Association (2000), the criteria for individuals who possess a high risk of developing GDM are one or more of the following:
- > 25 years of age;
- > 25 years of age and being overweight;
- family history of diabetes in first-degree relatives (mother, father, sister, brother);
- history of previous child with birthweight > 4 kg (8.8 lb); and continued on page 9
• ethnicity with high prevalence of diabetes (i.e., Aboriginal, Hispanic-American, African-American, or Pacific Islander)

Risks to mom and baby:
Developing GDM during pregnancy poses risks both to the mother and her baby. Risks for the mother include: possible delivery by caesarean section; increased risk of urinary tract infections; and, the risk of developing pregnancy-induced high blood pressure. Risks to the infant include: large birthweight; shoulder dystocia (shoulders becoming stuck during delivery); low blood sugar levels at birth (the fetus was secreting extra insulin in womb); increased risk for obesity and diabetes; prolonged newborn jaundice; and, respiratory distress at birth (Dunbar 2001).

What can I eat?
GDM in most cases is managed by diet and exercise. If a pregnant woman’s blood sugar levels continue to rise with lifestyle changes already made, she will need to start insulin therapy. Nutritional advice for GDM has changed over the last few years. At one time all sources of sugar were severely restricted. Today the goal of most nutritional plans for women with GDM is to aim for small frequent meals and snacks in order to provide their body and baby a steady, constant source of energy and ensure that the pancreas (which makes the insulin) is not overworked at any one time (Dunbar 2001). Overall, the nutritional requirements during pregnancy are similar for women with or without GDM (Gunderson 2004). The difference is that women with GDM are encouraged to pay special attention to portion sizes and the timing of their meals. Nutrition for those with GDM promotes food choices that provide appropriate weight gain as well as good steady control of blood sugar levels. Foods high in fiber are encouraged since they can help slow down how fast blood sugar rises.

Current nutritional controversies revolve around the subject of caloric restrictions and weight gain by obese women with GDM, as well as the composition of the restricted foods (Gunderson 2004). Evidence suggests that a high-fat, low-carbohydrate intake is associated with the development of blood sugar abnormalities in pregnancy (Romon, et al. 2001; Saldana, et al. 2004). Some caregivers are very strict with their obese patients who have GDM. The problem with some meal plans is that the quantity of food is unrealistic for a patient who is used to eating considerably more. Because of this, the patient’s chances of maintaining the dietary plan are decreased, potentially leading to increased blood sugar levels, and a large birthweight baby.

There is some controversy in treating women with GDM. A leading researcher and physician in this field, Dr. Jovanovic, stated recently that women with GDM having blood sugar levels in tight control (as close as possible to a nondiabetic state) is associated with a higher risk of intrauterine growth retardation in offsprings (Jovanovic 2004). She points to a study by Schaefer-Graf et al. (2004), which showed that when insulin therapy was determined by monthly fetal growth patterns (as evidenced by ultrasound) the outcomes improved, with a lower cesarean rate and no increased rate of large babies when compared with a group of women with GDM who were treated with insulin levels based solely on the mother’s current blood sugar levels. This study may help to change the course of treatment for women with GDM, and lead to individualized care based on the growth of her own baby in-utero, rather than based solely on blood sugar levels as indicated by a blood sugar monitor.

What are some other ways I can control my blood sugar?
Foods that contain sugar or carbohydrate are ones that can elevate blood sugar levels. Pregnant women with GDM need to monitor their intake of these foods. Some common sources of carbohydrate include: breads and cereals, pasta, fruits and some vegetables, milk, desserts such as cookies, candy, soft drinks, etc.

Glycemic Index
Some women have been told to choose foods that are low on the Glycemic Index (GI). The GI is a scale that ranks carbohydrate-rich foods, since all carbohydrates are not alike in the degree to which they raise the blood sugar (Rubin 1999). White bread is the food that everything is compared to on this scale (white bread has a GI of 100). A food that raises blood sugar by half as much as white bread has a GI of 50, while a food that raises blood sugar by 1½ times has a GI of 150. The GI is intended to help people choose foods that are lower in carbohydrates. For example, whole wheat breads, legumes, and oatmeal are low GI foods. Some problems with the scale currently exist:

- the GI of a carbohydrate may be different if it is eaten alone or with food;
- the GI may vary depending on how the food is prepared (e.g., thick pasta has a different GI compared to thin pasta); and
- some low GI foods are high in fat, like chocolate (Rubin 1999).

Despite some of its limitations, the GI scale is still a useful tool in helping to control blood sugar levels.

Artificial sweeteners
Artificial sweeteners are found in more and more foods today, from soft drinks, to yogurt, and even ketchup. We are eating more low-calorie sweeteners than ever before (Schardt 2004). Foods made with artificial or low-calorie sweeteners increase the choice of foods that a pregnant woman with GDM can eat without affecting her blood sugar levels. Some are safe, while others are not considered safe in pregnancy. Saccharin and cyclamates are not recommended for use during pregnancy or while breastfeeding. Acesulfame K, aspartame (unless she has continued on page 10
Phenylketonuria, a metabolic disorder), and Sucralose are safe during pregnancy when used in moderation. For example, a diet cola made with aspartame is safe to drink; however, the overall nutritional content is low (Chicago Dietitians Association 2000). The best advice for all pregnant women, those with or without diabetes, is to limit their consumption of all foods containing artificial sweeteners.

**What can I do to prevent myself from developing Type 2 diabetes?**

Women who have had GDM during a pregnancy have a 2 out of 3 chance of having another pregnancy with GDM. Post-delivery, the relief of no longer having diabetes gives women the false hope that they never have to worry again about diabetes. The statistics tell another story. Although only about 10% of patients have diabetes after delivery (Buchanan and Xiang 2005), many of these women will develop diabetes during their lifetime — especially if they do not make lifestyle changes. There are some risk factors that cannot be changed, such as ethnicity or age; however, obesity (causes insulin resistance) is the number one risk factor for developing Type 2 diabetes and is one that can be influenced. Women need to be encouraged to see their healthcare provider and ask to be tested yearly. Diabetes can be a silent disease that damages kidneys, eyes, and the circulatory system among others. Women and their families need to make lifelong lifestyle changes in their eating habits and activity levels in order to prevent or delay the onset of diabetes for themselves and their children. As parents, we can be good role models to our children in order to prevent the spread of diabetes to the next generation.

**References**


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